

(5) Claims 1-10 and 21-29 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims identified in the Action based on copending application Serial No. 09/571,825; and

(6) Claims 20, 30 and 31 were provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over the claims identified in the Action of copending application Serial No. 09/571,825.

Please amend the application for patent as directed below.

IN THE DRAWINGS

Please accept three sheets (i.e., Sheets 1-3) of informal drawings on which Figures 1-6 have been amended as indicated thereon, pursuant to 37 C.F.R. §1.121(d).

These sheets are substitutes for the like-numbered informal figures previously filed.

IN THE CLAIMS

Please amend Claims 1, 11 and 21 to read as follows.

Please note that Claims 2-10, 12-20 and 22-31 have not been changed. (The claims have been amended to comport with the requirements of 37 C.F.R. §1.121(c)(1)(i). Accompanying this Amendment is Appendix I in which a marked-up copy of the amended claims is provided showing all changes (i.e., with deletions enclosed in brackets and additions underlined), pursuant to 37 C.F.R. §1.121(c)(1)(ii).)

9

1. (Amended) An impeller for a regenerative turbine pump, said impeller comprising:

(a) a hub defining an aperture at a center thereof into which a shaft of said turbine pump is securable to allow said hub to rotate about a center axis therewith, said hub having an outer cylindrical surface;

(b) an outer ring concentric to said hub, said outer ring having an inner cylindrical surface; and

al (c) a plurality of vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring with each said vane comprising an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring, each of said vanes (i) having a V-shape of a prespecified angle centered relative to a plane normal to said center axis and (ii) having said entrance portion and said exit portion aligned in a non-linear disposition with respect to one another along a dimension of each of said vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring along at least one of an upstream face and downstream face of said vane from said entrance portion thereof through said exit portion thereof, said

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entrance and said exit portions of each said vane each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane.

2. (Unchanged) The impeller claimed in claim 1 wherein each of said outer sidewalls of each said exit portion are chamfered along a trailing corner thereof at said predetermined angle relative to said plane.

3. (Unchanged) The impeller claimed in claim 1 wherein said predetermined angle relative to said plane is substantially equal to an angle at which a fuel stream within said turbine pump approaches said outer sidewalls of said entrance portions.

4. (Unchanged) The impeller claimed in claim 1 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

5. (Unchanged) The impeller claimed in claim 4 wherein said predetermined angle is 30° relative to said plane.

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6. (Unchanged) The impeller claimed in claim 1 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

7. (Unchanged) The impeller claimed in claim 6 wherein said prespecified angle is 90° for said upstream face of said vane.

8. (Unchanged) The impeller claimed in claim 1 wherein said prespecified angle lies within a range of 80° and 86° for said downstream face of said vane.

9. (Unchanged) The impeller claimed in claim 8 wherein said prespecified angle is 82.3° for said downstream face of said vane.

10. (Unchanged) The impeller claimed in claim 1 wherein said aperture defined in said hub is notched to permit said impeller to be securely fitted onto said shaft of like shape.

11. (Amended) An impeller for a regenerative turbine pump, said impeller comprising:

(a) a hub defining an aperture at a center thereof into which a shaft of said turbine pump is securable to allow said

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hub to rotate about a center axis therewith, said hub having an outer cylindrical surface;

(b) an outer ring concentric to said hub, said outer ring having an inner cylindrical surface; and

(c) a plurality of vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring with each said vane comprising an entrance portion that extends linearly outward from said outer cylindrical surface of said hub and an exit portion that extends linearly from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring, each of said vanes having a V-shape of a prespecified angle centered relative to a plane normal to said center axis with said exit portion of each of said vanes being inclined forward of said entrance portion of each of said vanes so as to advance toward said inner cylindrical surface of said outer ring at an exit angle with respect to a direction of rotation of said impeller, said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane.

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12. (Unchanged) The impeller claimed in claim 11 wherein each of said outer sidewalls of each said exit portion are chamfered along a trailing corner thereof at said predetermined angle relative to said plane.

13. (Unchanged) The impeller claimed in claim 11 wherein said predetermined angle relative to said plane is substantially equal to an angle at which a fuel stream within said turbine pump approaches said outer sidewalls of said entrance portions.

14. (Unchanged) The impeller claimed in claim 11 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

15. (Unchanged) The impeller claimed in claim 14 wherein said predetermined angle is 30° relative to said plane.

16. (Unchanged) The impeller claimed in claim 11 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

9

17. (Unchanged) The impeller claimed in claim 16 wherein said prespecified angle is 90° for said upstream face of said vane.

18. (Unchanged) The impeller claimed in claim 11 wherein said prespecified angle lies within a range of 80° and 86° for said downstream face of said vane.

19. (Unchanged) The impeller claimed in claim 18 wherein said prespecified angle is 82.3° for said downstream face of said vane.

20. (Unchanged) The impeller claimed in claim 11 wherein said exit angle lies within a range of 15° to 50° .

21. (Amended) An impeller for a regenerative turbine pump, said impeller comprising:

AB (a) a hub defining an aperture at a center thereof into which a shaft of said turbine pump is securable to allow said hub to rotate about a center axis therewith, said hub having an outer cylindrical surface;

(b) an outer ring concentric to said hub, said outer ring having an inner cylindrical surface; and

41

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(c) a plurality of vanes extending between said outer cylindrical surface of said hub and said inner cylindrical surface of said outer ring with each said vane comprising an entrance portion that extends from said outer cylindrical surface of said hub and an exit portion that extends from a radially outward terminus of said entrance portion to said inner cylindrical surface of said outer ring, each of said vanes having a V-shape of a prespecified angle centered relative to a plane normal to said center axis and being curved with said entrance portion drawing away from said outer cylindrical surface of said hub at an entrance angle with respect to a direction of rotation of said impeller and said exit portion advancing toward said inner cylindrical surface of said outer ring at an exit angle with respect to said direction of rotation, said entrance and said exit portions each having a pair of outer sidewalls, each of said outer sidewalls of each said entrance portion being chamfered along a trailing corner thereof at a predetermined angle relative to said plane.

22. (Unchanged) The impeller claimed in claim 21 wherein each of said outer sidewalls of each said exit portion are chamfered along a trailing corner thereof at said predetermined angle relative to said plane.

42 9

23. (Unchanged) The impeller claimed in claim 21 wherein said predetermined angle relative to said plane is substantially equal to an angle at which a fuel stream within said turbine pump approaches said outer sidewalls of said entrance portions.

24. (Unchanged) The impeller claimed in claim 21 wherein said predetermined angle lies within a range of 15° to 45° relative to said plane.

25. (Unchanged) The impeller claimed in claim 24 wherein said predetermined angle is 30° relative to said plane.

26. (Unchanged) The impeller claimed in claim 21 wherein said prespecified angle lies within a range of 50° and 130° for said upstream face of said vane.

27. (Unchanged) The impeller claimed in claim 26 wherein said prespecified angle is 90° for said upstream face of said vane.

28. (Unchanged) The impeller claimed in claim 21 wherein said prespecified angle lies within a range of 80° and 86° for said downstream face of said vane.

1